PRICE
15¢

TECHNOLOGY DEPT.

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •

February 8, 1941

Rulerless Commonwealth

See Page 85

A SCIENCE SERVICE PUBLICATION

Do You Know?

The United States *peanut* crop just harvested is the biggest on record.

The Japanese official name for Korea, until recently Chosen, is now spelled *Tyosen*.

To conserve imported *iodine*, Germany has developed a bromine preparation as an antiseptic.

For best results, *paint* should be about the same temperature as the surface to which it is applied.

In hurricane winds, *rubber trees* drop their leaves, thereby eliminating wind resistance near the tree top and lessening pressure on the trunk.

Since it is difficult to import alcohol and acetone for Palestine's industries, the Hebrew University has evolved a way to produce them from *citrus peel*.

Jerusalem is attracting people from other parts of Palestine and Egypt, due to belief that the city is the safest in the Eastern Mediterranean war area.

A *"stellarium,"* which projects stars on a darkened ceiling, has been invented and constructed by three Pittsfield engineers for the Berkshire Museum, Pittsfield, Mass.

The U. S. Office of Indian Affairs estimate that one-fourth of the children of the *Navajo* tribe will read and write their native language by the end of this school year.

QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER *are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.*

ARCHAEOLOGY

What important archaeological discovery has been made in a cave in France? p. 85.

CHEMISTRY

What will dew do to the finish on an automobile? p. 94.

ENGINEERING

What astronomical instrument is used for projecting television pictures? p. 86.

Where has a new 147-mile high voltage power line just been completed? p. 92.

ENTOMOLOGY

What spray kills codling moth worms but is harmless to bees? p. 88.

GEOGRAPHY

How should you pronounce Eritrea? p. 89.

ICHTHYOLOGY

What sort of noises are made by fish? p. 88.

INVENTION

How can violin practice be made painless for the neighbors? p. 89.

MEDICINE

What sort of light is used to detect tuberculosis germs? p. 90.

NUTRITION

How will the new "enriched bread" differ from ordinary white bread? p. 83.

POPULATION

At what age should a mother bear her children? p. 93.

PHYSIOLOGY

How does aspirin differ from acetanilid in relief of headache? p. 87.

On what organs does vitamin D act to prevent or cure rickets? p. 86.

Under what circumstances have persons broken their own bones through violent exertion? p. 88.

PLANT PHYSIOLOGY

What does ultraviolet light do to one-celled plants when applied in smaller than deadly doses? p. 85.

PSYCHOLOGY

Among what classes of people are the most geniuses born? p. 88.

What effect does emotion have on vision? p. 89.

RADIO

How much does it cost to build a television broadcasting station? p. 84.

RESOURCES

What is the position of the United States with regard to drug and vitamin supplies? p. 87.

Tattooing was popular among pre-Chinese people of China.

Most American Indian *potters* were women, but in ancient Peru men worked at this craft.

Tests indicate that *human hair* is stronger than any animal's hair from which cloth is made.

An electric *hot box*, that ages hams in three months instead of the year usually required, has been devised.

Textile experts say that *cotton* is nature's whitest fiber.

The California *flying fish* can remain in the air 30 to 40 seconds, but most of its flights are briefer.

Too tiny to be seen without a microscope, *bacteria* in the ocean at one time would weigh about 10,000,000 tons.

About 3,000 *war gas* compounds were tested in the first World War, and about 25 or 30 were actually used in combat.

SCIENCE NEWS LETTER

Vol. 39 FEBRUARY 8, 1941 *No. 6*

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 2101 Constitution Avenue, Washington, D. C. Edited by WATSON DAVIS.

Subscriptions—$5.00 a year; two years, $7.00; 15 cents a copy. Ten or more copies to same address, 5 cents a copy. Back numbers more than six months old, 25 cents.

In requesting change of address, please give your old address as well as the new one, at least two weeks before change is to become effective.

Copyright, 1941, by Science Service, Inc. Republication of any portion of SCIENCE NEWS LETTER is strictly prohibited. Newspapers, magazines and other publications are invited to avail themselves of the numerous syndicate services issued by Science Service.

Cable address: Scienserve, Washington.

Entered as second class matter at the postoffice at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and in the Engineering Index.

Members of the American Association for the Advancement of Science have privilege of subscribing to SCIENCE NEWS LETTER at $3 a year.

The New York Museum of Science and Industry has elected SCIENCE NEWS LETTER as its official publication to be received by its members.

Advertising rates on application. Member Audit Bureau of Circulation.

SCIENCE SERVICE is the Institution for the Popularization of Science organized 1921 as a non-profit corporation.

Board of Trustees—Nominated by the American Association for the Advancement of Science: Henry B. Ward, University of Illinois; Edwin G. Conklin, American Philosophical Society; J. McKeen Cattell, Editor, Science. *Nominated by the National Academy of Sciences:* R. A. Millikan, California Institute of Technology; Harlow Shapley, Harvard College Observatory; William H. Howell, Johns Hopkins University. *Nominated by the National Research Council:* Ross G. Harrison, Yale University; C. G. Abbot, Secretary, Smithsonian Institution; Harrison E. Howe, Editor, Industrial and Engineering Chemistry. *Nominated by the Journalistic Profession:* O. W. Riegel, Washington and Lee School of Journalism; A. H. Kirchhofer, Buffalo Evening News; Neil H. Swanson, Baltimore Evening Sun. *Nominated by the E. W. Scripps Estate:* Karl Bickel, E. W. Scripps Co.; Warren S. Thompson, Miami University, Oxford, Ohio; Harry L. Smithton, Cincinnati, Ohio.

Officers—Honorary President: William E. Ritter. *President:* Edwin G. Conklin, *Vice-President and Chairman of Executive Committee:* Harlow Shapley. *Treasurer:* O. W. Riegel. *Secretary:* Watson Davis.

Staff—Director: Watson Davis. *Writers:* Frank Thone, Emily C. Davis, Jane Stafford, Marjorie Van de Water, James Stokley. *Photography:* Fremont Davis. *Librarian:* Minna Gill. *Sales and Advertising:* Hallie Jenkins, Austin Winant. Correspondents in principal cities and centers of research.

NUTRITION

Vitamin-Enriched Flour Goes Into Production

When You Eat Bread, Rolls or Cake Made From It, You'll Get as Much Thiamin as From Stone-Ground Flour

YOU will soon be eating bread made with the new "enriched flour." The flour will be enriched either by new milling processes or by adding essential vitamins to purified white flour, to preserve your health, to keep you fitter and more vigorous.

This revolution in America's bread and flour is designed to bolster morale as well as health. It is about to come to your table.

The new vitamin "enriched flour" is being put into immediate production since the millers have been given the "go ahead" signal by the National Research Council Committee on Food and Nutrition.

This crucial step to give all Americans more strength for national defense and designed to rescue some 45,000,000 of our population from hungerless vitamin famine was announced in Washington.

In a few weeks the term "enriched flour" will be widely advertised and popularized. Grocers and bakers will be selling "enriched bread." We shall all be eating it.

At the christening party attended by national nutrition authorities, representatives of the American Medical Association, the milling industry, the bakers, and federal government authorities, it was decided to call the new flour "enriched flour." Bread made from it will be called "enriched bread." These titles are only semi-official, but it is believed they will be made official by the U. S. Food and Drug Administration, when it announces its decisions as to a title and definition for bread and flour containing extra vitamins and minerals.

When you eat enriched bread, or rolls, cake or other products made from enriched flour, you will be getting as much of the morale vitamin B_1, or thiamin, as much of the pellagra-preventing nicotinic acid, and as much blood-building iron as your grandfather got from his stone-ground flour.

These three substances, thiamin, nicotinic acid and iron, in amounts to make the total content that of stone-ground flour from high vitamin wheat are now known to be so close to the requirements of the new flour definition the Food and Drug Administration is still working on that millers need not hesitate to start immediate production of such a flour. Later, and indeed before very long, another B vitamin, riboflavin, can be added.

This tremendous gain in nourishing qualities will be made without sacrifice of flavor, color, or baking qualities and with scarcely any increase in cost. The revolution in flour can be accomplished in one of two ways. The two vitamins and the iron can be added to ordinary white flour. This will not make any change in taste or color.

At present it will increase the price of flour by less than 50 cents a barrel, or about three cents for a 12-pound sack. This means an increase of less than two-tenths of a cent in the cost of a pound loaf of bread, which is so little that the retail price of enriched bread may be kept the same as that of ordinary bread.

Enriched flour may also be made, with the thiamin, nicotinic acid and iron content of stone-ground flour from high quality vitamin wheat, by modifications of the milling process. The enriched flour produced in this way will not be quite as snowy white as flour we know today. It may have a creamy color but ought to be as acceptable, at least for bread making, as any other. Enriched flour made in this way can be sold without any increase in price. Enriched bread also may be made by the use of special yeast.

Any significant increase in the price of the revolutionized bread and flour would defeat the purpose of the change because those who most need vitamins are those least able to spend more for food.

Well-to-do persons can stave off vitamin starvation by eating more liberally

DR. RUSSELL M. WILDER

Of the staff of the Mayo Clinic, he is now chairman of the National Research Council's Committee on Food and Nutrition.

of meats and vegetables rich in the vitamins which bread at present lacks. Or they can, on their doctor's advice, take vitamin chemicals in the form of pills.

For poor people, however, bread and cereals must be the mainstay of the diet for economic reasons. As for vitamin pills—it would cost nearly $5.00 to buy at present drug store prices the amount of thiamin alone which can be had in enriched flour for less than 50 cents a barrel extra, and this extra 50 cents also pays for the nicotinic acid and iron that will be in the enriched flour.

As soon as enriched flour and bread become available, bakers and consumers will be urged by those guiding the nation's nutrition program to prefer this scientifically constructed loaf to formulas for bread which fail to provide all the nutritional elements called for in the specifications of the new flour.

Thiamin, nicotinic acid and iron are "musts" for the new, enriched bread and flour. Scientists recognize, however, that adding these three chemicals to bread is not the entire answer to the restoring of bread to its ancient estate as the staff of life. The coarse dark breads our grandfathers ate represented about 85% of the contents of the wheat berry. Our modern white flour represents only from 60 to 70%. Lost with this 30% to 40% of the wheat berry are not only thiamin, nicotinic acid and iron, but other members of the vitamin B complex. Among these are riboflavin, pantothenic acid, vitamin B_6 and many others which have only recently been discovered. As these become available chemically, as thiamin and nicotinic acid now are, they will be added to enriched flour in the amounts considered desirable for the nation's welfare.

National defense needs have speeded the bread and flour revolution to a much earlier start than was expected. Millers had been developing this program, but were waiting for the U. S. Food and Drug Administration to announce a name and standards or definition, for the new flour. That announcement is anticipated in the very near future.

Meanwhile, the Nutrition Planning and Policy Committee of the federal government which is functioning in the national nutrition program with the advice of the National Research Council's committee on food and nutrition, has recognized the need for early action because of the emergency.

There is much reason to believe that a population receiving enough vitamins in its food is better able to withstand the stresses and strains of war and threats of war. This committee has urged the millers to start immediately making a flour which, as it becomes available, will provide an increase in vitamin consumption the country over. And the millers are moving full speed ahead.

Science News Letter, February 8, 1941

DEFENSE TRAINING

An instructor explains the mysteries of a lathe to one of the students in the WPA training course at Newton, Mass.

RADIO

Television Broadcasting Not Limited to Wealthy

"TELEVISION broadcasting is by no means limited to those with millions to invest," Allen B. Du Mont, president of the Du Mont Laboratories, said in a statement on the present status of television.

"It is the writer's honest opinion," he declared, "that a good start in television broadcasting can be made for as little as $25,000. And that figure can even be shaved if need be. For that sum one can obtain a 50-watt video and audio transmitting setup, which will prove adequate for the average city coverage. The transmitting aerial will have to be at least 250 feet high for satisfactory coverage of the desired area. The film pickup, camera and associated equipment will round out the requirements.

"At this early date almost any kind of program material will prove adequate. Just as the local weekly paper has a place in the community, despite the overwhelming bulk and appeal of the big metropolitan daily, so the local television station can find a place despite the millions that may be talked about for big metropolitan enterprises."

Defense demands are temporarily slowing the development of television, thinks Mr. Du Mont.

"The greatest progress in any one year was scored in this video form of broadcasting during the past twelve months," he stated. "And, were it not for the tremendous demands of our national defense emergency which must be necessarily first in importance over all other activities in the laboratory, factory and transmitting station, television might well be on its commercial way this year."

Science News Letter, February 8, 1941

PSYCHOLOGY

Uncle Sam Trains Girls To Make Shell Fuses

THE DEXTROUS fingers of girls are now being trained at Newton, Mass., by Uncle Sam for the delicate precision work of making time shell fuses.

Unique among the programs for training men for defense jobs is this WPA training course, the only one where women are being fitted for the defense industries. All those taking training at Newton are girls, and they have proved to be more adaptable than men at learning this particular kind of work.

Nearby watch factories, including the

Waltham Watch Company, are working on defense orders for instruments such as the girls are learning to make. The women in this project have already demonstrated that they possess hand and finger dexterity needed for this precision work.

The trainees are taught to operate light lathes, watch lathes, bench engine lathes, kick presses, punch presses and eyelet and riveting machines. They also receive instruction in spot welding.

The program was initiated by the Newton Public School system, as part of the national WPA Vocational Training Program.

Science News Letter, February 8, 1941

ARCHAEOLOGY

Magnificent Art Gallery Created by Cavemen of France

Discovery Originally Made by Five Schoolboys Near Montignac Is Confirmed By Abbe Henri Breuil

DISCOVERY in unoccupied France of a "magnificent" 30,000 year old gallery of prehistoric cave-man art, rich in pagan human figures, enormous bulls, horses and one black rhinoceros, is stirring scientific circles in the United States.

The world-famous authority, Abbe Henri Breuil, has succeeded in reporting to the British science journal, *Nature*, (Dec. 21) his authentication of the art discovery near the little town of Montignac in southwestern France.

Five schoolboys were the real discoverers of Lescaux cave, which will take its place in prehistoric annals alongside the "Sistine Chapel of Magdalenian art" in Altamira cave, in Spain. The new-found gallery of European art is pronounced far more ancient than the Altamira paintings, which are rated about 20,000 years old. Lescaux cave was decorated in closing days of the Aurignacian era of the Old Stone Age, a stage of culture which archaeologists have begun to distinguish by the still rather unfamiliar name of the Perigordian epoch.

Enormous bulls nearly 16 feet long, drawn in wide black lines with big spots sprinkled on the beasts' heads, impressed the Abbe Breuil, as he became first expert critic to appraise the ancient masterpieces. In one area of the dark underground passages and galleries, he counted more than 80 pictures, chiefly done on blocks that have fallen from the vault above. Some ascending galleries of the cave are still almost entirely unexplored.

The artists who worked by torchlight in the cave, painted horses with red color, giving them heavy coats in softly dappled pattern. Other animals portrayed, probably with magic rites as an aid in hunting, include oxen, bison, stags, two lions, and one questionable bear figure.

Describing a striking scene, suggesting prehistoric European drama, the Abbe Breuil reports:

"To the left a black rhinoceros walks slowly away; in the center, drawn in red, a half-conventionalized man is lying beside a javelin and a throwing stick. To the right, a sand-colored bison outlined in black gazes at him; its entrails seem to be flowing out like a horse ripped open in a bull-fight."

In peaceful contrast: near the man a bird is perched on a post.

Foreseeing many surprises in store when the art can be further studied, the French prehistorian says that the pictures show signs of different techniques with frequent painting over the same space and frequent attempts at restoration.

Signs, such as chessboard patterns, resembling coats of arms, and pronged, comb-shaped patterns, and barred rectangles are numerous among the pictures.

Science News Letter, February 8, 1941

PLANT PHYSIOLOGY

One-Celled Plants Stimulated by Ultraviolet

ULTRAVIOLET radiation, usually considered inimical to life, proves a stimulant to reproduction in primitive one-celled green water plants when applied in less than lethal doses, experiments by Mrs. Florence Meier Chase, Smithsonian Institution biologist, have demonstrated.

Ultraviolet rays of certain specific wavelengths are now widely used in hospitals and elsewhere to rid the air of bacteria. Earlier researches by Mrs. Chase showed that the invisible rays had similarly deadly effect on her primitive green plant cells. But when the same kind of plants are exposed to the same ultraviolet wavelengths for about two-thirds of the time necessary to kill them, instead of dying they multiply at greatly increased rates.

Increased reproduction rates differed according to specific wavelengths, Mrs. Chase found. She found four wavelengths biologically effective: 2352, 2483, 2652 and 2967 Angstrom units, respectively. Each of these wavelengths increased the cell-division rate in a quite definite ratio.

Green cells exposed to the stimulating dose of the 2352-Angstrom rays multiplied 4.7 times faster than a control culture of unirradiated cells of the same kind. The 2483-Angstrom wavelength stimulated cell multiplication to 3.9 times the normal rate, and the 2652-Angstrom wavelength rays produced a stimulation to 4.65 times normal. Least stimulation was brought about by the longest (2967-Angstrom) wavelength: 1.62 times normal.

Although the green cells increased their numbers thus rapidly under the influence of ultraviolet radiation, the size of the individual cells in the stimulated cultures became much smaller than normal, as if the cells could not take time to grow up before they were hurried into reproduction.

Science News Letter, February 8, 1941

ENTOMOLOGY

Bees Have No Rulers, Yet Their Society Is Not Anarchy

See Front Cover

SPRING'S first hints, bringing earliest tree buds to swelling, tempts venturesome bees out of doors to see what's going on. Already, on warm days, they are dragging out of the hives the bodies of their luckless companions who have not survived the winter, and dumping them unceremoniously to the ground beneath. Bees, often pointed to as the ultimate in the socialist state, certainly are complete utilitarians and apparently have no sentiments of any kind.

The life of the bee colony is ably described and beautifully pictured in a new book by Edwin Way Teale, *The Golden Throng (Reviewed, SNL, this issue)*. Every bee in the hive knows its job and does it, without needing to be told or compelled to do so. It goes through a definite round of duties according to its age: nursemaid, home worker, forager afield—again with no authority other than its own instincts to

notify it of promotions or changes of task. Socialist state the honeyed commonwealth may be; but it is no dictatorship.

Science News Letter, February 8, 1941

PHYSIOLOGY

Discover How Vitamin D Acts to Cure Rickets

ALMOST every school child can tell you that vitamin D, the sunshine vitamin, cures and prevents rickets. Neither the doctors who prescribe vitamin D for prevention or cure of rickets, however, nor the scientists who discovered the vitamin and learned how the sun's rays produce it have heretofore been able to tell exactly how the vitamin does its rickets curing and preventing work.

Now it has been discovered that the vitamin cures rickets or prevents it probably through its action on both the kidneys and intestines. Discovery of the vitamin's effect on kidney function has just been reported by Dr. Harold E. Harrison and Dr. Helen C. Harrison, of Cornell University Medical College. (*Journal of Clinical Investigation,* January.) The discovery, like so many others in science, depended on previous research by many other scientists who each added a bit of evidence that gave clues for further discoveries.

The bowlegs and other bony deformities of rickets, as you probably have heard, are due to the fact that the bones do not get enough calcium and phosphorus to make them hard and strong. Even with a plentiful supply of calcium and phosphorus coming into the body in the food, the bones fail to calcify unless there is also a plentiful supply of vitamin D.

The vitamin, scientists found, helps in the process by which the calcium and phosphorus from food are absorbed from the intestines into the blood for transportation to the bones. But this is not the only way in which the vitamin helps to prevent or to cure rickets. Even with plenty of phosphorus in the blood, rickets can develop because the phosphorus, instead of going to the bones, is eliminated through the body via the kidneys.

Vitamin D, the Harrisons found, also acts to prevent this loss of bone-building phosphorus. The kidneys may take the phosphorus out of the blood but when vitamin D is present, instead of eliminating the phosphorus with waste material, they return it to the blood in sufficient amounts for bone building purposes.

Science News Letter, February 8, 1941

NEXT: TELEVISION NEWS REELS?

When your local theater is equipped to show television with sound, this is the way the instruments may be placed.

ENGINEERING

Television Pictures Thrown On Screen From Balcony

In Order To Use Maximum of Light, Projector Is Schmidt Astronomical Camera in Reverse Position

TELEVISION pictures projected on a theater screen 15 by 20 feet, from a projector in the balcony sixty feet away, were demonstrated in New York by RCA engineers to show the Federal Communications Commission the latest advances in this field.

In order to use the greatest possible amount of light, a projector is used which is really an astronomical camera of the Schmidt type in reverse. The seven-inch face of the high voltage kinescope, on which the picture is formed, faces away from the screen, towards a 30-inch concave mirror. This reflects the image through a glass plate to correct certain faults or aberrations, then to the screen. By the method used for rating camera lenses, the system has a speed of F. 0.7.

The Commission was also shown a home television receiver in which the pictures were projected to a screen 13½ by 18 inches. This used a conventional type of high speed lens, treated, however, with non-reflecting films, to reduce light losses.

Some of the views witnessed were transmitted from the RCA mobile television unit, stationed at Camp Upton on Long Island, 68 miles away. Automatic relays, at Hauppauge and Bellmore, picked up the short range signals and passed them along. A new horn type antenna was used to receive them, in the relay towers and finally in a window on the 62nd floor of the RCA building.

Radio facsimile, by which a newspaper complete with illustrations can automatically be printed in a home re-

ceiver, reproducing the original in the broadcasting station, can be combined with simultaneous broadcasts, on the same wavelength, the engineers showed the Commission.

The facsimile was broadcast with ordinary "amplitude modulation," in which the waves are the same distance apart, but vary in their height. The same carrier was given frequency modulation, by which the distance between the waves is changed in step with the sound vibrations. At the receiving end, the two were sorted out, and each used to operate the proper receiver.

Science News Letter, February 8, 1941

RESOURCES

U.S. Has Plenty of Vitamins, Vaccines, and Anesthetics

Only Drugs of Which Supplies in United States May Run Short if War is Prolonged Are From Certain Plants

THE ONLY drugs of which supplies in this country may run short if war in Europe is prolonged are those drugs obtained from certain plants, S. De Witt Clough, president of the Abbott Laboratories, reports in the forthcoming issue of *War Medicine*.

War Medicine is the new medical journal published by the American Medical Association.

Of vitamins, including cod liver oil, vaccines and other biologics, hormone remedies such as insulin for diabetes, sulfanilamide and the other sulfa remedies, anesthetics of all types, antiseptics, disinfectants, bandages and surgical dressings, the United States has plentiful supplies, Mr. Clough's survey shows.

"The drug industry today is in a much better position to supply the medical profession, hospitals, the Red Cross, the War Department and governmental agencies with pharmaceuticals and medicinal chemicals than it was during the World War," he declares.

The botanical drugs of which there is some danger of a war shortage include such items as belladonna and scopolamine, the latter familiar to the layman through its use for inducing "twilight sleep."

"There is already a growing scarcity of such items as belladonna root and hyoscyamus, a source of scopolamine," Mr. Clough reports. "While these botanicals have been coming from foreign countries, it is reasonable to believe that sufficient supplies of belladonna can be cultivated in this country to take care of civilian and military requirements.

"This was the case in the World War, when not only belladonna but digitalis and other medicinal plants were grown in Washington, Oregon, California, Minnesota, Michigan, Indiana, New Jersey, Pennsylvania, Virginia and Florida. Digitalis of excellent quality is still grown in the United States but not in sufficient quantity, as yet, to supply domestic, export and military needs. It is hoped that domestic cultivation will be increased.

"Atropine sulfate can be obtained from jimson weed, which can be grown on almost any farm land. It may also come about that the alkaloid, atropine sulfate, can be synthesized. When the World War was over, the cultivation of belladonna and some other medicinal plants was practically abandoned in the United States, owing to the lower cost of labor in other countries."

Mr. Clough urges that agricultural departments of state universities and colleges grow such medicinal plants in this country as are adapted to the soil and climate of the various states and experiment with others not yet cultivated in this country.

On the bright side, Mr. Clough reports that we are in excellent condition to produce large quantities of biologic items such as vaccines and antitoxins; that we could take care of a large part of the world requirements for bandages and dressings; that we are in "an advantageous position" to produce enough vitamin oils to take care of the entire western hemisphere; and that we lead the world in the production of anesthetics.

There is no fear of shortage of minerals used in medicine such as mercury, arsenic or bismuth, since these are either available here or may be obtained from South America. We can make sulfanilamide, sulfapyridine and sulfathiazole from materials produced in this country.

Science News Letter, February 8, 1941

PHYSIOLOGY

New Ideas on Hot-Water And Drugs For Pain

FAMILIAR stand-bys for the relief of pain—hot-water bottles, ice bags, aspirin and other drugs including codeine and alcohol—have recently been put through some rigorous scientific tests by two groups of scientists with results that your doctor may be applying before long.

Instead of ordering a hot-water bottle, to relieve pain, for example, he may prescribe the use of a device that intermittently applies heat or a cooling breeze or both alternately. Results of using such a device are reported by Dr. George D. Gammon and Dr. Isaac Starr, of the University of Pennsylvania. (*Journal of Clinical Investigation,* January.)

The hot-water bottle and the ice bag relieve pain by counterirritation. When you rub the sore spot after bumping against a sharp table edge, you are also using counterirritation to relieve the pain. The Philadelphia doctors tested various counterirritants on themselves and concluded that periodic rather than continuous counterirritation, produced the maximum relief of pain. Tests of some 20 patients with the special device for producing periodic counterirritation suggested that proper use of such a method would give much more relief than "haphazard application of hot-water bottles and ice bags."

The effects of pain-relieving drugs were tested by Dr. H. G. Wolff, Dr. J. D. Hardy and Dr. H. Goodell, of the Russell Sage Institute of Pathology, New York City. Acetylsalicylic acid, familiarly known as aspirin, relieves pain but has very little psychological effect, their studies, also reported in the *Journal of Clinical Investigation,* show. Acetanilid and acetophenetidin are popular as headache remedies, it appears from the studies, because besides relieving pain these substances lessen anxiety and restlessness.

Alcohol, like morphine, has a double action in that it both relieves pain and makes the person feel detached about the pain even while perceiving it.

Giving two pain-relieving drugs together, for example codeine and acetylsalicylic acid, does not increase the pain-relieving action beyond that of the most active ingredient of the combination, but does increase the sedative effects, which may be what your doctor wants to achieve when he prescribes such a combination.

Science News Letter, February 8, 1941

ENTOMOLOGY

New Spray Poison Kills Codling Moth Worms

DEADLY to apple worms, harmless to bees, is a new virtue found in the new poison-spray material, phenothiazine, now being tested by the U. S. Department of Agriculture. The discovery is subject of a joint report by L. M. Bertholf of the Bureau of Entomology and Plant Quarantine and J. E. Pilson of Western Maryland College.

One of the great problems involved in control of the worst of apple enemies, codling moth (whose larvae are the "worms" found in apples), is the deadliness to bees of the arsenical sprays commonly used. Beekeepers and orchardists are constantly at feud over this question.

In the tests reported recently, bees were given heavy doses of phenothiazine without any apparent ill effects. In contrast, minute doses of calcium arsenate proved deadly, and lead arsenate was also an active bee poison in the doses bees are likely to get in gathering pollen from sprayed orchards.

Phenothiazine is not yet recommended for general use in orchard spraying, because thus far it has not produced uniform results on the codling moth larvae. It is hoped that further experiments will make it more completely dependable.

Science News Letter, February 8, 1941

PSYCHOLOGY

Most Child Geniuses Come From Masses

WEALTHY CLASSES do not produce the majority of geniuses. Much larger numbers of gifted children could be found in the slums and teeming tenements if society would only look for them there, Prof. Paul A. Witty, of Northwestern University, believes.

Search of census figures has already revealed to investigators, he says, that if all gifted children were found, the majority would come from the ranks of skilled, semi-skilled and unskilled laborers—the masses. They would not be the sons and daughters of professional men and the rich.

This is not, he explained, because the masses are superior to the high economic classes in intelligence, but simply because there are so many more of them.

Recent tests of the children of different races confirm the findings of anthropologists that claims are groundless that "one race, one nation or one class has any God-given right to rule."

Prof. Witty with Dr. Martin D. Jenkins has studied 103 very bright Negro children with IQ above 120, who were selected from about 8,000 Negro children in Chicago. They found 29 in the "genius" class with IQ's above 140 (100 is normal). One girl has the extremely remarkable IQ of 200.

High intelligence as shown by the IQ tests is not, however, sufficient as an indication of genius in your child, he warned "Giftedness," he said, "can be estimated only by observation of behavior.

"The child whose performance is consistently remarkable in any potentially valuable area might well be considered gifted; he should be given the opportunity which his attainment demands for nurture and continuous growth, but his development should not be predicted nor his future attainment prescribed except as increased growth necessitates adaptations and changes."

Science News Letter, February 8, 1941

ICHTHYOLOGY

Fish Can Bark, Grunt And Can Even Sing

"DUMB as a fish" is a simile as inaccurate as it is common, according to scientists of the U. S. Fish and Wildlife Service. Fish have no vocal cords, but many species of fish are still able to make sounds, ranging from grunts and barks to actual musical notes.

Most musical of American fishes is one known as the singingfish, that produces a humming sound by vibrating its air bladder. This species, known also as the midshipman, lives in the Gulf of Mexico and in the Pacific ocean. Warm-water fishes in Old-World seas are also said to produce musical tones—perhaps the foundation for the classic myth of the sirens' song.

The majority of our sound-producing fishes, however, are not musical. Grunting and drumming sounds are most common; "grunt" and "drum" are actual names of fish. The porkfish or pigfish is another that got its name from its grunt. The croaker is still another fish named for its voice, which is said to be the loudest of all our native fishes. The sound of the Conger eel is a bark.

Most of the audible fishes produce their sounds by vibrating their air-bladders, either by the rapid tugs of attached muscles, or by sliding muscles over the tightened membrane. Some, however, become vocal by grating their teeth or rasping with their gill-covers.

Science News Letter, February 8, 1941

IN SCIENCE

GENERAL SCIENCE

Plan To Expand Illinois Institute of Technology

PLANS for a $3,000,000 expansion of its physical plant, intended to create a new technological center in Chicago, have been announced by the Illinois Institute of Technology. A new mechanical laboratories building, an engineering and science building, a library and humanities building, a student union, a field house and a power plant are projected.

The Institute was formed last July by consolidation of Armour College of Engineering and Lewis Institute of Arts and Sciences. Though both the Lewis and Armour campuses are now in use, the former will eventually be abandoned, as the extensions will be made to the Armour campus.

Science News Letter, February 8, 1941

PHYSIOLOGY

Bones May Be Broken By Violent Exertion

BROKEN bones due to violent muscular exertion are rare, but six such cases were reported by Dr. Frank P. Strickler, of Louisville, Ky., at a recent meeting of the American College of Surgeons.

In three of these cases the muscular violence of pitching a ball broke the bone of the pitcher's arm. A young woman broke the bone in her left arm by forcibly throwing her arm out in an effort to catch herself while falling, although her arm did not hit anything.

A structural steel worker broke his knee cap by muscular violence when he was sitting with his back braced helping to push a steel beam into position with his left leg flexed at the knee.

A young farmer broke several vertebrae in the left side of his back when pushing a truck that had become stuck in a mudhole. He felt something give way in his back and had acute pain. At first he thought he had lumbago, but eventually an X-ray picture of his spine was taken and it revealed the broken bones.

All the patients made good recoveries.

Science News Letter, February 8, 1941

NCE FIELDS

GEOGRAPHY

East African War News, Ethiopian Names Are Back

BRITISH advances into Italian East Africa bring to the news names that Americans learned to pronounce glibly back in 1935, when Ethiopia was waging a losing fight for independence.

Here are some pronunciations you may remember from that war, plus others new in this one:

Haile Selassie, Emperor of Ethiopia, now hopeful of driving the Italian conquerors from his kingdom: Hay-leh Seh-lahs-yeh'.

Eritrea, Italian colony north of Ethiopia, where British are pushing east: A'ree-treh'ah.

Kassala, frontier and railhead town in Sudan, retaken by British in starting drive east across Eritrea: Kas'suh-lah.

Massawa, Italian naval base and important port on Red Sea in Eritrea, toward which the British are moving: Mus-sah'wah.

Asmara, capital of Eritrea, on the British route toward Massawa: Ahs-mah'rah.

Addis Ababa, capital city in heart of Ethiopia: Ad'dis Ah-ba-bah'.

Tsana, important lake in northern Ethiopia, source of the Blue Nile: Tsah-nah'.

Neghelli, Italian airdrome 120 miles south of Addis Ababa, bombed by British: Neh-geh'lee.

Gallabat, important Sudan post seized by Italians last August, now in area of Sudan-Ethiopian border war: Gal'la-bat.

Science News Letter, February 8, 1941

PSYCHOLOGY

Fear, Rage Affect Vision, New Experiments Reveal

SCIENCE confirms your idea that rage or fear can "blind" you. Experiments by Dr. E. I. Strongin, Mrs. N. Bull, and Dr. B. Korchin of the College of Physicians and Surgeons, Columbia University, show that vision is not the same when you are under emotional strain as it is when you are relaxed.

Motion pictures taken of the eyes of persons reading showed that while 36 per cent of them could see better, when emotionally roused, another 22 per cent became worse under the strain.

More critical was the test of how the two eyes work together. This is important for the motorist who is trying to gauge the speed of an approaching car, or for the airplane pilot who is bringing his ship in for a landing. It is essential for the perception of distances and depth.

From 14 per cent to 22 per cent of those tested became worse in this binocular functioning under stress of emotion. Only 4 per cent improved under the excitement.

Men whose duties will require them to use their eyes under powerful emotional strain as in fighting or any hazardous situation, should have their vision tested under emotion, not while they are sitting calmly in the quiet of a doctor's office, these scientists recommended.

Psychologists are reminded that many of the crashes which involve army pilots occur when the flyer is returning from an exciting and fatiguing flight and tries to land his speeding plane in a small field. In this sort of situation, ability of the eyes to work together is put to severe test.

Science News Letter, February 8, 1941

OPTICS

Multifocal Lenses Have No Abrupt Change

OLDER persons, who now wear bifocal lenses, will be interested in new "multifocal" lenses. With the old kind, there is a sharp line of demarcation between the sections for near and far vision, but with the new type, one eases gradually into the other. (*Beach Lens Co., 469 Virginia St., Buffalo.*)

Science News Letter, February 8, 1941

INVENTION

Violin Practice Painless With New Invention

VIOLIN PRACTICE is made painless — for the neighbors — with a newly patented invention. It consists of a mute, which attaches to the bridge as usual. However, it contains a tiny microphone, which picks up the sound vibrations. They are amplified electrically, and can be heard through head phones worn by the violinist. Thus, though others hear the tones muted, he hears them in full volume. (*Max Rice, Buffalo, U. S. Patent No. 2,229,189.*)

Science News Letter, February 8, 1941

CHEMISTRY

False Twist Gives Yarn Effect Like That of Wool

SYNTHETIC yarns can be given a false twist, thereby imparting a crimp so that fabrics made with them have an effect like wool. It is made with a device having a twist tube with an internal helical passage through which the yarn passes, the tube being spun at high speed. (*Celanese Corp., New York City.*)

Science News Letter, February 8, 1941

INVENTION

Bottle Smashing Made Easy By New Machine

BOTTLE-SMASHING made necessary by the notice "Federal law forbids the re-use of this bottle" on liquor containers, may be accomplished quickly with a new hand operated machine. The small bits of glass are collected in a removable can, which holds the remains of some 80 bottles. (*Iron Porter, Inc., 509 Fifth Ave., N. Y. C.*)

Science News Letter, February 8, 1941

GENERAL SCIENCE

New Freedom for Humanity Seen in Future Science

FUTURE developments of science may equip a person with very small instruments and concentrated supplies carried in his pockets which will provide all human needs in communication, food and transport, J. G. Crowther, British science writer, predicts in his new book, *The Social Relations of Science* (reviewed, SNL, this issue).

"At present science is developing in the direction of big instruments and organizations," said Mr. Crowther. "It seems probable that it will evolve through this phase, and arrive at a new and higher one in which its instruments will again be small and compact. Science may show how a man can provide all his needs, in communication, food, transport, etc., from very small instruments and concentrated supplies carried in his pockets. Theory may show how the important features of the universe may be summarized in a few formulae, so that everyone may carry in his head the theoretical equipment for solving from first principles any ordinary problem arising in daily life. If science developed to this stage, it would provide new concrete bases for freedom."

Science News Letter, February 8, 1941

MEDICINE

New Light to Seek Germs

Fluorescence, Which Illuminates Modern Beauty Shops, Offices and Stores, Traps TB Germ Under Microscope

By JANE STAFFORD

FLUORESCENCE, which lights many modern beauty parlors, barbershops, stores and offices, is now being used like a detective's flashlight by scientists stalking tuberculosis, the Great White Plague.

Uncle Sam is using it to rule out tuberculosis among the young men coming up for training in America's peacetime army. It makes possible X-ray pictures of a man's chest and lungs that show the doctor whether or not he has tuberculosis.

Latest development in this particular TB stalking is the use of miniature films which enormously cut the cost of X-ray examinations—an important item when millions of men must be examined.

When a suspicious spot is seen on these pictures of the lungs, doctors turn to the laboratory for confirmation of the diagnosis of tuberculosis. Sputum or other fluids from the body are examined under powerful microscopes in a search for the tuberculosis germ itself.

Latest aid in this part of the TB stalking is the use of the new kind of detective flashlight, fluorescence, to spot the elusive germs. Stalking tuberculosis germs with fluorescence is said to be a more sensitive method than any hitherto available in America. It promises to find the germs earlier and to make more certain that treatment has arrested the disease.

Fluorescence, or fluorescent light, is made from invisible light. To make it, ultraviolet light waves, so short they cannot be seen, are stretched, when they strike certain chemicals, into longer waves which can be seen. Fluorescent light is also made from X-rays, which are really light waves even shorter than ultraviolet waves. When an X-ray examination is made, it is the fluorescent light, made by the X-rays as they hit certain chemicals on the screen over the patient's chest, which illuminates the lungs inside the chest so they can be seen. Even for X-ray photographs, fluorescent chemicals are put in the plate, or a fluorescent screen used in contact with it, to speed up the exposure.

Without fluorescent light, TB stalking in the laboratory is done by putting a drop of sputum on a glass slide and then staining it with a red dye, carbol-fuchsin. This must be steamed into the germs and the background is then counterstained with a blue dye. The tuberculosis germs appear as slender, minute red rods against the blue background, but they are often very difficult to find. The slide is put under a high-powered microscope with a delicate oil immersion lens, and the TB stalker spends many backbreaking hours searching every tiny bit of the material on the glass slide. Frequently more than one slide must be examined, and the sputum or other material must be concentrated before examination in order to find one or two of the tiny red rods.

When the new method is used for stalking TB germs under the microscope, the suspected sputum or other material is put on the microscopic slide and soaked in a dye, carbol-auramin, which then is bleached from all the material except the bacteria, which retain it.

When placed under a microscope, illuminated with invisible ultraviolet light, any tuberculosis bacteria present glow as bright yellow rods easily seen against a nearly black background, since the dye has the power of fluorescence. So great is the contrast that lower power microscope objectives are sufficient to show them. Magnification of 400 diameters is enough.

Delicate oil immersion objectives no longer need be used and more of the material may be seen at the same time. Rapid searching of the slides is possible with little likelihood of missing even a single bacterium. In addition to the time saved in looking for the germs, the time of preparing the slides for examination is cut down because no counter-staining and no steaming processes are required.

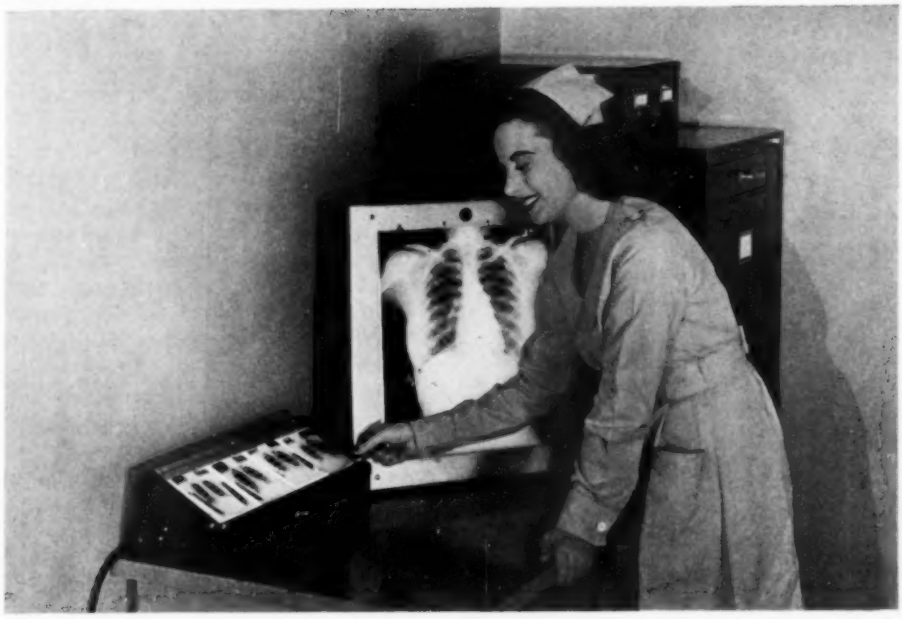
This method of TB germ stalking was first devised by Dr. P. K. H. Hagemann, a German physician. The equipment has been improved, simplified and proven useful by Dr. Oscar W. Richards, in the research department of the Spencer Lens Company. Careful comparisons of results with the fluorescence technic and the old style method of looking for TB germs in sputum or other material have been made by Dr. Richards, Dr. David K. Miller, of Buffalo, and Dr. E. E. Kline and Raymond E. Leach of the Cattaraugus County, N. Y., Laboratory. These scientists all found the fluorescence technic more sensitive and quicker than the method they had been using, when measured by the number of germs found and the ease with which they were located.

"The greater sensitivity," Dr. Richards explains, "is due to the carbol-auramin combining with more of the bacteria than does the carbol-fuchsin and being less easily removed; as well as the greater visibility of the preparations. The added sensitivity is important to establish early infection, in the examination of difficult materials, and greater assurance that proper treatment has arrested or cured the disease."

Before the disease can be treated and cured, the patients must be found, and

MINIATURE X-RAYS

A patient (not a draftee) stands in front of the new type X-ray camera that automatically reduces a large picture to a 4 x 5 inch film. The X-ray tube, of conventional type, is at the left. Just in front of the patient is the fluorescent screen, while the camera proper, which photographs it, is beyond.



LARGE AND SMALL

Comparison of the new small films with the usual size is shown to the right. Four of the reduced films are seen in the small viewer, and one of the usual size to the nurse's right.

the earlier they are found and start treatment, the greater their chance of recovery. In the early stages, however, this disease gives little sign of itself. By the time the patient is coughing, or having hemorrhages, the disease has been well established. Long before this the patient is sick, though he may not know it, and is endangering his family and associates with the germs from his body.

In order to find these patients in the early stages, health authorities try to examine as many apparently healthy people as possible, especially those in the age groups most likely to have tuberculosis. Mass surveys in schools, industries and among other groups of people have been conducted.

Uncle Sam is on the lookout for tuberculosis in every man who comes up for training under the Selective Service Act. Army training would prove too strenuous for persons with tuberculosis, besides which the presence of unsuspected tuberculosis patients in a training camp would be a danger to other men.

The methods used for detecting early cases of tuberculosis are the tuberculin test, which is a skin test, and the X-ray examination of the chest and lungs. Cost of the X-ray films has limited the number of such examinations that could be made, although otherwise it is considered both valuable and practical for detecting unsuspected tuberculosis.

Cost of films and processing chemicals represent only a comparatively small proportion of the total cost of X-ray examinations. The major part of the cost goes for X-ray apparatus, overhead, and the professional services of the physician and his technicians. Reduction in film size, however, is considered highly important in surveying large groups of people because the expenditure for materials required by the small film method is only about one-tenth of that needed for the conventional procedure. This means that for a given amount of money to be spent for films and chemicals, ten times the number of patients can be examined with four-by-five-inch films as could be done with 14x17-inch radiographs, the ordinary X-ray pictures.

The four-by-five-inch films will be used by the Medical Corps of the U. S. Army for its TB stalking among recruits and Selective Service trainees, it is indicated by an announcement from the General Electric X-ray Corporation of an order for 45 of the units that make these small films, to be delivered as rapidly as possible.

Saving in cost of films for mass examinations can be made by using 35-millimeter films, Dr. W. Palmer Dearing and Alexander E. Turner, U. S. Public Health Service, have recently reported. In their studies, the pictures were taken with portable X-ray equipment manufactured by General Electric and by the Westinghouse X-ray Company.

Fluorescence has to be used because the short-wave X-rays, though similar to light, cannot be bent with lenses. If they could, it would only be necessary to focus them on a small film, as in the ordinary camera. Instead, they must be converted to light, and that used for the picture.

Accordingly, the new apparatus has a fluorescent screen. If you were to look at it, when the examination is being made, you would see the patient's ribs, and his lungs inside. But it is enclosed, and a fixed camera, permanently focused on the screen, and with a high speed lens to permit the shortest possible exposures, looks at it and records what it sees. The films are in long rolls, they can be quickly changed for the next picture, and records rapidly made.

Certain precautions, of course, must be taken, since film exposed directly to the X-rays will be fogged and ruined. The camera, and especially the film holder, must be made of lead, through which the rays cannot pass. Spare rolls of film must be kept in lead boxes. Fortunately, the X-rays travel only in straight lines, so a lead screen between film and tube is enough. Also, the outfits are so constructed that the X-rays are confined to the path they must follow in taking the picture. Stray radiation, which might be harmful to the attendants, is eliminated.

The 35-millimeter film is the same size that is used in theatrical motion pictures and also in some of the most popular sizes of candid cameras. It is relatively inexpensive, but the picture is so tiny that it must be magnified to see the details. However, it is used widely by libraries as "microfilm" for copying documents, and special reading machines are commercially available. These project a single picture to a ground glass screen 11x14 inches. Such a reading machine would be ideal for examining X-ray pictures, since mechanism is provided for rapidly shifting the film.

The 4x5-inch film, however, gives a picture that is large enough to be examined without magnifying, so, in some instances, it may have an advantage.

Science News Letter, February 8, 1941

●RADIO

Prof. Arthur Allen, ornithologist of Cornell University, will tell of his work in recording bird sounds as guest scientist with Watson Davis, director of Science Service, on "Adventures in Science," over the coast to coast network of the Columbia Broadcasting System, Thursday, Feb. 13, 3:45 p.m. EST, 2:45 CST, 1:45 MST, 12:45 PST. Listen in on your local station. Listen in each Thursday.

ENGINEERING

147-Mile Transmission Line Protects Chicago's Power

Defense Construction Will Be Less Likely To Suffer From Current Failure Because of New Installation

DEFENSE construction in and around Chicago will, on account of a new high voltage power line just completed, be less likely to suffer from electric failure. Details of the line, which is 147 miles long, and brings more than 200,000 horsepower of electrical energy from coal fields in southern Illinois, were given by M. S. Oldacre and F. O. Wollaston, of the Commonwealth Edison Co. They spoke before the meeting of the American Institute of Electrical Engineers in Philadelphia.

Special consideration, they reported, was given in designing and building this line to obtain reliable service and eliminate outages caused by the two worst enemies of transmission lines—sleet and lightning—both of which are quite prevalent and severe along the route of the line. As a result of study by engineers connected with the operation of existing transmission lines and also those of the electrical manufacturing companies, it is believed that the solution of these two major troubles of transmission lines has been obtained.

It has been found that when wind of sufficient force strikes sleet-covered wires, the wires will be lifted momentarily in the same way as a kite or airplane, and the alternate rising and falling and the swinging of the wires causes them to appear to "gallop" and sometimes come in contact with one another. This will at least interrupt power service over the line if it does not cause actual burning or breaking apart of the wires. Common practice on important smaller lines is to put extra electric current through the sleet-covered wires to melt the sleet away before it becomes dangerous. The wire or cable required for this line was so large—one and one-sixth inches in diameter—that it could not be heated sufficiently. Instead, extra-strong supports were provided and the wires placed farther apart than usual so that there is no chance of the wires "galloping" or swinging together.

The elimination of lightning troubles on existing transmission lines has been obtained by using sufficient insulators for the electric wires and by placing additional wires above the electric power wires to intercept the lightning currents and direct them into the earth over paths of very low resistance. On this new line the latest type of high-strength insulators, nearly ten feet long, have been used and the intercepting wires, known as "ground" wires, have been installed so that there is practically no chance of a lightning flash to the electric wires.

Science News Letter, February 8, 1941

Don't Delay

getting that new book you want to read. SCIENCE NEWS LETTER **will gladly obtain for you any American book or magazine in print. Send check or money order covering regular retail price ($5 if price is unknown, change to be returned) and we will pay postage in the United States. When publications are free, send 10c for handling. Address:**

Book Department

SCIENCE NEWS LETTER

2101 Constitution Ave. Washington, D. C.

Combination Drive

COMBINING electrical and mechanical drives, a new principle for transmitting power from a bus or truck engine to the wheels was described by Ernst Weber, of the Polytechnic Institute of Brooklyn, speaking before the meeting of the American Institute of Electrical Engineers.

In ordinary electric drives, he explained, there is no mechanical connection between the engine and the drive. The former runs an electrical generator, the current from which operates a motor in the transmission.

The "Electrogear," as the new device is called, uses two electrical machines as in the electric drive, but these machines are constantly coupled through a differential gear. Now, in the electric drive one machine always acts as generator and absorbs all the engine power and the other machine always acts as motor carrying the entire power to drive the vehicle; this accounts for the considerably lower overall efficiency as compared with the standard mechanical drive.

In the "Electrogear," however, the two electrical machines carry only a fraction of the engine power and alternate as generator and motor depending on the car speed and on the road condition. This interchange is controlled by a small auxiliary generator, comparable to the battery charging generator. Since there is continuous mechanical connection between the engine and the driven axle, the electric power only acts as a torque regulator or continuously variable gear ratio; it goes into over drive automatically. This, Mr. Weber said, accounts for the high overall efficiency and for a fuel economy at least comparable with that of the standard gearshift transmission.

Science News Letter, February 8, 1941

Air Resists Current

CIRCUIT breakers are important electrical accessories, for, when a short circuit occurs, they disconnect the lines, preventing damage. In the past, it has been the practice where heavy currents are involved, to immerse the breaker in an oil bath, since the current would arc across the space between the contacts in air.

Two Westinghouse engineers, however, told their colleagues of a new type they have devised. Though only air separates the contacts, it can break a circuit of 50,000 amperes at 5,000 volts, they declared. This is accomplished, they explained, by the use of magnets which fill the space with ionized gases having a much greater resistance than normally.

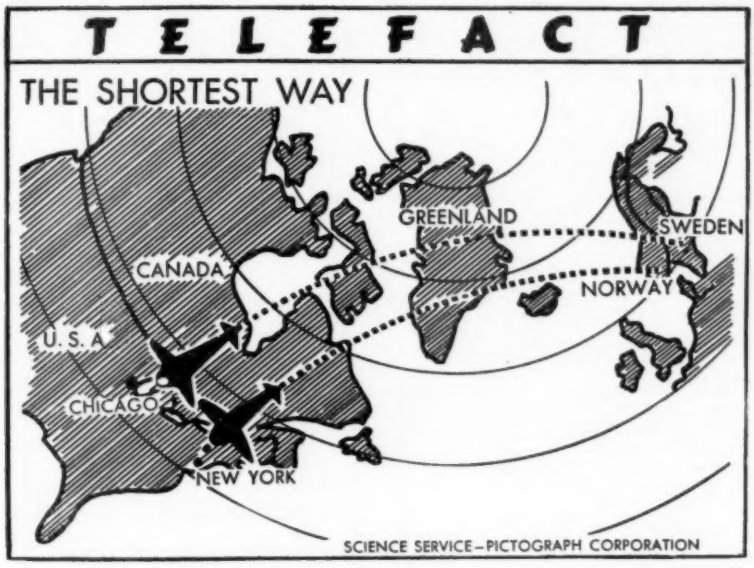
Science News Letter, February 8, 1941

Light 3-Horsepower Motor

A THREE-HORSEPOWER electric motor, which weighs less than 12 pounds compared with 150 pounds for an ordinary motor of the same power, has been developed for aircraft use, T. B. Holliday, of the U. S. Army Air Corps at Dayton Field, told the meeting. During the last two years, he said, the output of engine-driven electric generators has been increased eight times, with but a small increase in weight.

Science News Letter, February 8, 1941

Nearly half of the 92 known elements are used in an *automobile*.



POPULATION

America Warned Against Axis Ideal of Huge Families

A Woman Should Do All Her Child-Bearing Before She Is 35; Should Have Not More Than Seven Children

WARNING American mothers against huge flocks of eight or nine children—such as Axis powers encourage—Dr. Alan F. Guttmacher, obstetrician of the Johns Hopkins University School of Medicine, told America how to attain greater efficiency in motherhood to build national strength.

"The nation should encourage the younger women to bear the children," said Dr. Guttmacher, addressing the conference on strengthening our population for national defense, called in New York by the Birth Control Federation of America.

For best results in producing healthy infants and reducing death and invalidism among mothers, Dr. Guttmacher advocated:

A woman should have her first baby after the age of 20 and before 25, if optimum results are to be expected.

On the same terms, she should finish her child-bearing career by the time she is 35.

"Purely from the medical point of view, omitting social and economic factors," he said, "it is quite safe for the normal woman to bear five children. She may even have six or seven, but it is most unwise for her to have eight or more."

It is probably ideal, he added, if children are born 27 to 30 months apart.

Impressive data have become available in America within the past year, Dr. Guttmacher emphasized, which make it possible now to show the health hazards of producing a great number of children. In two investigations of childbirth records, one made by U. S. Public Health Service scientists in New York State, and the other by Dr. N. J. Eastman who surveyed over 45,000 cases at the Johns Hopkins Hospital, the same striking facts are disclosed.

Emphasizing these findings as "extraordinary," Dr. Guttmacher said that they show the birth of second and third babies to be attended by least risk of maternal death. Risk of bearing first and fourth babies is about equal. After the fourth child, danger increases with each birth, until having the ninth baby brings serious risk. Having a ninth baby is 330% more dangerous than having a third, Dr. Eastman reported. The Public Health investigation rates it even more serious—344%. This fact, Dr. Guttmacher added, was news. It "confirmed what a few iconoclastic observers had come to suspect."

Pronouncing the policy of encouraging large families inefficient from a national standpoint, Dr. Guttmacher pointed out that a woman who dies bearing a ninth child leaves probably six or more half-orphans. Production of very large families is also a source of invalidism to mothers, and the infant death loss rises acutely as births reach the fifth child.

Summing up what he called "one obstetrician's attitude toward the problem of maternal health and the nation's strength," Dr. Guttmacher said:

"The nation will not be strengthened by the wastage of haphazard pregnancy. It can be strengthened by efficient reproduction through selective pregnancy, selecting those in whom pregnancy is ill-advised and offering them the means of avoiding conception; selecting the young and fit to bear children and through education to make them realize the privilege and responsibility of planned parenthood."

Science News Letter, February 8, 1941

For Population Blues

PEOPLE of the United States were given a new prescription for routing the population blues when Dr. Halbert Dunn, chief statistician of the Census Bureau's vital statistics, advised a sharp change of viewpoint for turn-

Solve the Problem of Visualizing...

FACTS FIGURES IDEAS

I am interested in free catalog of pictorial charts, maps and pictographs ☐

My special interests are:

☐ Lectures and exhibits
☐ Scientific papers
☐ Book illustration
☐ Pamphlets, posters, leaflets
☐ Promotion material
☐ Dramatized reports

Cut out entire ad, attach to your letterhead and mail to:

PICTORIAL STATISTICS • INC.
142 LEXINGTON AVENUE • NEW YORK
LExington 2-8149

ing our population catastrophe into a glorious adventure.

Census returns confirm forecasts that the United States must prepare to deal with increasing numbers of older people and a slowed down birth rate, Dr. Dunn told the conference on strengthening our population for national defense.

Advising Americans to cease worrying over dire consequences of this trend, imagining empty school houses, unbearable taxes for pensions, huge unemployment and other oft-predicted calamities, Dr. Dunn said that the population problems can be solved without much trouble. The difficulty is, he explained, that "we insist on trying to solve these problems in the light of the economic and social structure of yesterday."

"The population problems cannot be solved," he declared, "unless we are willing to face the basic readjustments necessary. We must be willing to challenge every dictum which we have been reared to consider as unquestionable and which stands as a barrier. Such axioms as: the sacredness of human life, the right of the individual to have a baby, the right to own national resources personally, the sovereignty of a nation."

Suggesting that our population catastrophe might be changed into a glorious adventure, if we can change our viewpoint, the population expert declared:

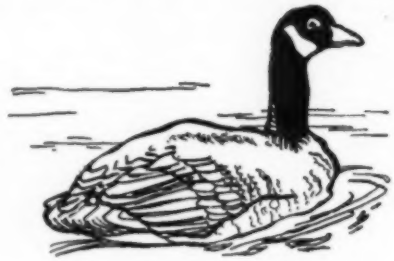
"Perhaps we value our particular social structure too highly. Perhaps we cannot solve these problems with an economic system which has always seemed like a rock of Gibraltar to us. The real Gibraltar is now in danger. London is in flames. Yet from the wreckage, a new Britain is being reborn."

Science News Letter, February 8, 1941

Ten doctors of the Mayo Foundation are taking a civilian pilot training course to improve methods of giving *physical tests* to prospective fliers.

ZOOLOGY

NATURE RAMBLINGS
by Frank Thone



War and Wildlife

WILDLIFE in Great Britain is feeling the effects of war in numerous ways, states a note in the weekly journal, *Nature*.

Sand dunes and lonely islands along the coasts, suddenly given active human populations as Britons guard against invasion, have to that extent ceased to be desirable nesting places for wildfowl, which are either migrating elsewhere or suffering a decline in numbers. Inland, something of the same kind is occurring, as rural parks are tramped over by brigades of men in training.

Another thing that has disturbed wildlife has been the redistribution of British industry, especially the establishment of factories in rural areas, to make discovery and attack by the Nazi air raiders more difficult. This has driven many game birds and animals out of sanctuaries where they have hitherto been undisturbed. Added to this is the increased pollution of inland waters by factory wastes, in both old and new industrial areas, with considerable loss of fish life.

Breaking up of great estates has disrupted the pattern of game protection, since the old-time gamekeepers have found their occupation gone. This has been intensified also by the home-guard demands made upon these usually middle-aged men, because of their familiarity with the terrain to be defended against possible landings of parachutists and their skill with small-arms. A result of this diversion of gamekeepers' attention has been the rapid increase in certain predatory bird and mammal species, such as owls, carrion crows, kestrels, foxes and otter, with a possible slower rise in numbers of badgers and ravens.

Changes in plant life may result from the devastation spread by mass bombing raids even in cities.

Science News Letter, February 8, 1941

CHEMISTRY

Dew Cause of Paint Failure Blamed on Sunshine

AUTOMOBILE owners are advised to garage their cars at night to preserve the finish, by Ralph J. Wirshing, assistant head of the general chemistry department of the General Motors Research Laboratories. This prevents dew from forming on the body, and dew seems to be an important factor in causing the failure of finish, he stated.

It has formerly been supposed, he declared, that ultraviolet rays in sunlight, the same ones that cause sunburn on human bodies, were mostly responsible for paint deterioration. However, carefully checked tests made over a period of several years in Florida, using a sunshine meter to gauge its intensity, revealed the curious result that worst failures occurred when there was least sunshine. Then it was discovered that failure was greater with exposure from midnight to noon than from noon to midnight.

This suggested that dew, followed by sunshine, was the offender, and confirmation was obtained when further tests were made with a "dew box" to produce it artificially. Rainfall, strangely, was found not to have the same effect as dew.

The research is being continued, Mr. Wirshing announced, and it is hoped to learn more of the exact mechanism by which the effect is produced, so that steps may be taken to prevent it.

Science News Letter, February 8, 1941

An archaeologist traces the concept of a Fuehrer or Duce back to 3000 B.C., when the superman admired in Persia was the *lion tamer*.

Preliminary figures on the *Soviet Union* census of January 1939 give a population of 170,467,000.

Science News Letter Subscription Coupon

To Science News Letter, 2101 Constitution Avenue, Washington, D. C.

☐ Start ☐ Renew my subscription to SCIENCE NEWS LETTER for ☐ 1 year, $5 ☐ 2 years, $7

Name_____

Street Address_____

City and State_____

(No extra postage to anywhere in the world)

•First Glances at New Books

Additional Reviews On Page 96

GENERAL SCIENCE

THE SOCIAL RELATIONS OF SCIENCE—J. G. Crowther—*Macmillan*, 665 p., $3.50. The author, a leading British science writer, offers this book as a "possible selection of the data which will assist all interested in science to work out the best policy for it." It is well worth reading because it brings together in its 83 chapters much material that was scattered and presents an enlightened viewpoint on the part that science should play in our social structure. See page 89.

Science News Letter, February 8, 1941

ECONOMICS

THE ADMINISTRATION OF PUBLIC RECREATION—George Hjelte—*Macmillan*, 416 p., $3. The defense program, setting as it does a new value on physical fitness, will lend new interest to textbooks such as this one by Los Angeles' superintendent of recreation.

Science News Letter, February 8, 1941

HISTORY

AN OUTLINE HISTORY OF THE WORLD SINCE 1914 (4th ed.)—J. H. Landman—*Barnes & Noble*, 347 p., illus., 75c. Another of the "College Outline Series," handy reading for background on current world problems. The concise encyclopedic material is well arranged for quick reference use, and supplemented by maps, index, and bibliographies.

Science News Letter, February 8, 1941

PHYSICS—CHEMISTRY

TEXT-BOOK OF PHYSICAL CHEMISTRY—Samuel Glasstone—*Van Nostrand*, 1289 p., illus., $10. This is a complete treatise, intended to fill the need for a textbook of a standard between the elementary introduction to the subject, and those of a much more advanced character and intended for students who already have a fair knowledge of the subject.

Science News Letter, February 8, 1941

TECHNOLOGY

MODERN PLASTICS CATALOG, 1941—*Breskin Publishing Corp.*, 476 p., illus., $3.50. In past years it has been the practice of the publishers of the monthly journal, *Modern Plastics*, to devote one augmented issue each year to a catalog. So rapid have been the advances in this field, however, that each year it has been necessary to devote a still larger volume to it. It will be of interest in many branches of technology and industry. Profusely illustrated, it gives details about all available plastics, their chief uses, and methods of fabrication. There is a table of solvents, another of plasticizers and a particularly valuable chart giving the latest information on plastic properties, both chemical and physical.

Science News Letter, February 8, 1941

GENERAL SCIENCE

REPORT OF THE SECRETARY OF THE SMITHSONIAN INSTITUTION and Financial Report of the Executive Committee of the Board of Regents for the Year Ended June 30, 1940—*Govt. Print. Off.*, 115 p., illus., 25c.

Science News Letter, February 8, 1941

ECONOMICS

THE SOVIET POWER—Hewlett Johnson—*Modern Age Books*, 352 p., $1. The Dean of Canterbury, from a not too peaceful garden of one of England's oldest cathedrals, writes with detail and persuasion, of the socialist world as created by the Soviets. This book has been widely distributed in war-torn England and this American edition takes account of position of Soviet Russia in the present struggle. How science has served is told.

Science News Letter, February 8, 1941

MEDICINE

YOUR MENTAL HEALTH—B. Liber—*Melior Books*, 408 p., $3.

Science News Letter, February 8, 1941

PHOTOGRAPHY

TABLE TOP PHOTOGRAPHY—Norris Harkness and Ernest E. Draper—*Harcourt, Brace*, 180 p., illus., $2.95. If you have not yet adopted this attractive hobby, you will be amazed at the artistic effects you can obtain with such oddments as a bit of glass, a pipe cleaner and a tuft of cotton. Full directions for construction, lighting, etc., will launch you on a new winter evening pastime.

Science News Letter, February 8, 1941

BACTERIOLOGY—MEDICINE

GERMS AND THE MAN—Justina Hill—*Putnam*, 461 p., illus., $3.75. In a delightfully breezy style and with great clarity, Miss Hill imparts a wealth of sound information about germs, the diseases they cause, and the weapons forged by nature and science to protect us against them. The author, associate in urology at the Johns Hopkins Medical School, has played no small part in ferreting out the secrets of these germs and devising ways of fighting them.

Science News Letter, February 8, 1941

HISTORY

FIFTY YEARS OF WAR AND DIPLOMACY IN THE BALKANS, Pashich and the Union of the Yugoslavs—Count Carlo Sforza; trans. by J. G. Clemenceau Le Clercq—*Columbia Univ. Press*, 195 p., $2.75. A sympathetic and vigorously written account of Serbian struggles for independence amid European political maneuvers, told with significant incidents. Pashich, noted Serbian leader, dominates the account.

Science News Letter, February 8, 1941

GEOGRAPHY—JUVENILE

RIVERS OF THE WORLD, Stories of the Great Rivers of Each Continent—F. Raymond Elms—*Albert Whitman*, 79 p., illus., $2. Fifteen rivers, their history, distinctions, commercial importance, and other facts briefly told. A picture map of each river is given and color sketches on text pages show striking river scenes.

Science News Letter, February 8, 1941

HYGIENE

HYGIENE (3rd ed.)—Florence L. Meredith—*Blakiston*, 822 p., illus., $3.50.

Science News Letter, February 8, 1941

PALEONTOLOGY

STUDIES OF CENOZOIC VERTEBRATES AND STRATIGRAPHY OF WESTERN NORTH AMERICA—Paul C. Henshaw and others—*Carnegie Institution of Washington*, 194 p., illus., $2.75, paper; $3.25, cloth. Several studies on comparatively recent fossils of extraordinary interest to students of the history of North American mammals.

Science News Letter, February 8, 1941

INTERESTED? in Science

PURPLE - X Ultra - Violet lamp — a powerful source of U.V. (150 watts, 50 hours, 110 volts, ordinary socket). Minerals, dyes, vaseline, natural teeth shine in its rays. Fun on a party, see who has false teeth or paint skull on face with vaseline. Useful to teachers. $2.00, express chgs. collect.

ALNICO most powerful magnet known —the new super-powerful alloy of Aluminum, Nickel, Cobalt developed by G.E. Will be a source of continual interest on your office desk. Lowest prices, C-102 1¾" high, $1.00 each, $1.50 per pair. C-103 1¾" high, $1.50 each, $2.25 per pair (best Buy).

FREE

FREE BRYOPHYLLUM — a remarkable house plant. Lay on soil and new plants sprout from each notch. Sent free with a year's subscription to QUEST Science Summary, the beautiful new illustrated monthly magazine of Science and All Garden Experiments. Subscription $2.00, sample 25c. ALSO FREE—small Alnico magnet for subscribing promptly.

QUEST Publishing B-11, Wellesley, Mass.

•First Glances at New Books

Additional Reviews On Page 95

EDUCATION—SOCIOLOGY

MATCHING YOUTH AND JOBS, A Study of Occupational Adjustment—Howard M. Bell—*Amer. Council on Education,* 277 p., illus., $2. A report prepared for the American Youth Commission on a most timely subject in these days of urgent preparation for the nation's defense.

Science News Letter, February 8, 1941

CHILD STUDY

CHILDREN IN THE FAMILY, A Psychological Guide for Parents—Florence Powdermaker and Louise Ireland Grimes—*Farrar & Rinehart,* 403 p., $2. A handbook of advice. The senior author is associate in psychiatry of the College of Physicians and Surgeons.

Science News Letter, February 8, 1941

DOCUMENTATION

PUBLIC ADMINISTRATION ORGANIZATIONS, 1941—*Public Administration Clearing House,* 187 p., $1.50. A useful directory of the unofficial organizations in the field of public administration in the United States and Canada.

Science News Letter, February 8, 1941

GEOLOGY

THE GEOLOGY OF THE CLEVELAND REGION—Arthur B. Williams—*Cleveland Museum of Natural History,* 61 p., illus., 50c. A vest-pocket-sized local guide, which might well serve as a model, both in brevity and clarity, for similar aids to students of nature in other places.

Science News Letter, February 8, 1941

EDUCATION—GEOGRAPHY

PAN-AMERICANA, Visual and Teaching Aids on Spain, Spain in the United States, and Latin America—Lili Heimers, comp.—*Visual Aids Service, New Jersey State Teachers' College, Upper Montclair, N. J.,* 29 p., 50c. Charts, exhibits, films, pictures, slides and publications available from various sources and useful in teaching classes in junior and senior high school and junior college.

Science News Letter, February 8, 1941

LANGUAGE

LINQUISTIC MATERIAL FROM THE TRIBES OF SOUTHERN TEXAS AND NORTHEASTERN MEXICO—John R. Swanton—*Govt. Print. Off.,* 145 p., 20c.

Science News Letter, February 8, 1941

ENTOMOLOGY—JUVENILE

LIFE IN AN ANT HILL—Pennsylvania Work Projects Admin.—*Albert Whitman,* 47 p., illus., 50c. A few of the more interesting things about ants, in big-print words and simple pictures, for the younger group of readers.

Science News Letter, February 8, 1941

TECHNOLOGY

A PORTRAIT OF PACKAGING—Arthur J. West—*Natl. Pub. Co.,* 69 p., illus., $1.50. One of a series of romances of American business, telling how the goods we use came to be packaged.

Science News Letter, February 8, 1941

EVOLUTION

THE COURSE OF EVOLUTION, by Differentiation or Divergent Mutation Rather Than by Selection—J. C. Willis—*Cambridge (Macmillan),* 206 p., $3. The author finds Darwinian selection unacceptable as an explanation of origin of new species; his conclusions "point to a process of definite single mutations originating within the organism, and lead him to suppose that evolution is not the result of chance selection, but rather of a law not yet comprehended."

Science News Letter, February 8, 1941

GEOLOGY

EARTH SCIENCES, Meteorology, Oceanography, Geology—J. Harlen Bretz—*Wiley,* 260 p., illus., $2.25. Designed for a general survey course in college, this book can be read with interest and profit by those whose college days are over (or never happened). The author has a gift for vivid presentation, whether in the classroom or in print; his selection of subject matter is judicious, and the diagrammatic illustrations make it practically impossible to miss his points.

Science News Letter, February 8, 1941

JOURNALISM

THE NEWS AND HOW TO UNDERSTAND IT—Quincy Howe—*Simon and Schuster,* 250 p., $2. A readable mixture of opinion and fact on how and why we get our news through the press, through magazines and the radio.

Science News Letter, February 8, 1941

ECONOMICS

HOUSING FOR DEFENSE—The Factual Findings by Miles L. Colean; The Program by The Housing Committee—*Twentieth Century Fund,* 198 p., $1.50. This emergency report on keeping roofs over the heads of those engaged in defense work was prepared by the Twentieth Century Fund as a part of a general survey of the housing situation in the United States.

Science News Letter, February 8, 1941

GENERAL SCIENCE—PHILOSOPHY

SCIENCE, PHILOSOPHY AND RELIGION, A Symposium—*Conference on Science, Philosophy and Religion in Their Relation to the Democratic Way of Life,* 443 p., $1.50. The publication of the papers before the significant conference on science, philosophy and religion held last fall makes the thoughts presented available to a larger audience. More than any other one book, perhaps, this presents a cross-section of the agreements and conflicts in our present-day intellectual world.

Science News Letter, February 8, 1941

MEDICINE

THE MERCK MANUAL OF THERAPEUTICS AND MATERIA MEDICA (7th ed.)—*Merck & Co.,* 1436 p., $2.

Science News Letter, February 8, 1941

GEOGRAPHY—MEDICINE

TEST TUBES AND DRAGON SCALES—George C. Basil and Elizabeth Foreman Lewis—*Winston,* 316 p., illus., $2.50. This story of an American doctor's experiences in China is particularly interesting since the city where he practised until 1932 is Chungking, present capital of the Chinese Republic.

Science News Letter, February 8, 1941

PATHOLOGY

BIRD MALARIA—Redginal Hewitt—*Johns Hopkins Press,* 228 p., illus., $1.10. This monograph aims to give both beginning students and advanced workers a single source of information on the history, materials, methods and results in the field of bird malaria studies.

Science News Letter, February 8, 1941

ENTOMOLOGY

THE GOLDEN THRONG, A Book About Bees—Edwin Way Teale—*Dodd, Mead,* 208 p., illus., $3. See page 85.

Science News Letter, February 8, 1941

MEDICINE

AMERICAN JOURNAL OF VETERINARY RESEARCH—*American Veterinary Medical Assoc., 600 S. Michigan Ave., Chicago, Illinois,* 96 p., Vol. I, No. 1, Oct., 1940, quarterly, $4 per yr. A new journal, "dedicated to all veterinarians" and having as its object "the prompt publication of deserving articles on research and investigation by American veterinarians and their co-workers in the field of veterinary science." Abstracts of important material from other veterinary journals published in English are promised for later issues.

Science News Letter, February 8, 1941

DR. CONCRETE INST.
7400 SECOND BLVD
DETROIT, MICH.
REG. U.S. PAT. OFF.